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## ARITHMETIC.

Conducted by B.F.FINKEL, Kidder, Missouri. All contributions to this department should be sent to him.

### SOLUTIONS TO PROBLEMS.

19. Proposed by MISS LECTA MILLER, B. L., Professor of Natural Science and Art, Kidder Institute, Kidder, Missouri.

Bought sugar at  $6\frac{1}{2}$  cents a pound; waste by transportation and retailing was 5%; interest on first cost to time of sale was 2%. How much must be asked per pound to gain 25%?

Solution by H. R. YOUNG, West Sunbury, Pa. and A. L. FOOTE, C. E., No. 80 Broad St. New York City.

For 100 pounds he must pay \$6.50.

Interest at 2% = \$.13 makes \$6.63, the cost.

125% of \$6.63 = \$8.28 $\frac{1}{4}$ , what he must charge.

$\$8.28\frac{1}{4} \div (100 \times .86) = .08\frac{1}{4}\frac{1}{8} = 8\frac{1}{4}\frac{1}{8}$  cents per pound.

Also solved by I. L. BEVERAGE, P. C. CULLEN, J. K. ELLWOOD, P. S. BERG, and G. B. M. ZERR.

20. Proposed by L. B. HAYWARD, Superintendent of Schools, Bingham, Ohio.

I owed a merchant \$600. The merchant agreed to take part of the amount and wait a year for the balance, if I would pay interest in advance. I paid \$300. How much of this was interest on the unpaid balance, and how much went toward the payment of debt?

- I. Solution by J. K. ELLWOOD, Principal of Colfax School, Pittsburg, Pennsylvania, and Professor G. B. M. ZERR, Principal of High School, Staunton, Virginia.

Let  $P$  = payment. Then  $(600 - P) .06 + P = 300$ .  $\therefore .94P = 264$ ,

$\therefore P = \$280.85\frac{1}{7}$ .  $\$300 - \$280.85\frac{1}{7} = \$19.42\frac{1}{7}$ , interest on unpaid debt.

- II. Solution by I. L. BEVERAGE, Monterey, Virginia, and JOHN T. FAIRCHILD, Ada, Ohio.

Let 100% be the face of the new note. Then 6% is the interest, and  $(\$600 - 100\%)$  is the amount paid on the debt. But,  $(\$300 - 6\%) =$  amount paid on the debt.

$\therefore (\$600 - 100\%) = (\$300 - 6\%)$ , or  $94\% = \$300$ .

$\therefore 1\% = \$3.1915$ .  $\therefore 100\% = \$319.15$ , new note.

$\therefore \$319.15 \times .06 = \$19.15$ , interest on the unpaid balance, and  $\$600 - \$319.15 = \$280.85$ , amount paid on the debt.

This problem was also solved by P. S. BERG, R. H. YOUNG, A. L. FOOTE, P. C. CULLEN, and JOHN FAUGHT.

21. Proposed by A. L. FOOTE, C. E., No. 80, Broad St., New York City.

A merchant bought a certain quantity of corn for which he paid a certain sum of money; but on measuring he found only  $\frac{3}{4}$  of quantity he expected. He sold it gaining  $\frac{1}{3}$  of the cost and received \$2,160, which was at the rate of  $12\frac{4}{13}$  cents per bushel more than he would have paid had he received the quantity expected. How many bushels did he suppose he had bought, and at what price?

[Selected from *Robinson's Arithmetical Problems.*]

Solution by JOHN FAUGHT, Vincennes University, Vincennes, Indiana.

1.  $\frac{1}{8}$  of cost + cost =  $\frac{3}{8}$  of cost = \$2160.
2.  $\therefore$  the cost = \$1920.
3. The number of bushels  $\times$  cost per bu. = \$1920.
4.  $\frac{3}{4}$  number of bu.  $\times$  cost per bu. =  $\frac{3}{4}$  of \$1920 = \$1872.
5.  $\frac{3}{4}$  of number of bu.  $\times$  cost per bu. +  $\frac{3}{4}$  of number of bu.  $\times$  \$.12 $\frac{4}{3}$  = \$2160.
6.  $\therefore$  \$1872 +  $\frac{3}{4}$  of number of bu.  $\times$  \$.12 $\frac{4}{3}$  = \$2160,
7. or  $\frac{3}{4}$   $\times$   $\frac{1}{1\frac{4}{3}}$  of number of bu. = 2160 - 1872 = 288,
8. or .12  $\times$  number of bu. = 288.
9.  $\therefore$  number of bu. = 2400.
10. \$1920  $\div$  2400 = \$.80, price per bushel.  
 $\therefore$  he bought 2400 bushels at 80 cents per bushel.

This problem was also solved by G. B. M. ZERR, R. H. YOUNG, A. L. FOOTE, COOPER D. SCHMITT, P. S. BERG, P. C. CULLEN, I. L. BEVERAGE, J. K. ELLWOOD, and W. I. TAYLOR.

## PROBLEMS.

27. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

$A$  and  $B$  buy a ship for  $S = \$80000$ , of which  $A$  has the  $ab$ th =  $\frac{5}{8}$ , and  $B$  the  $cd$ th =  $\frac{3}{8}$ , interest. They sell  $C$  the  $mn$ th =  $\frac{1}{2}$  interest for  $P = \$10000$ ; and then agree that  $A$  should retain the  $pq$ th =  $\frac{7}{12}$ , and  $B$  the  $rs$ th =  $\frac{1}{12}$ , interest. How is the purchase-money received from  $C$  to be divided between  $A$  and  $B$ ?

28. Proposed by J. K. ELLWOOD, A. M., Principal of Colfax School, Pittsburg, Pennsylvania.

A rectangular field (not square) contains as many acres as there are boards in the fence enclosing it. The fence is 4 boards high and each board is 11 feet long. How many acres in the field?

Solutions to these problems should be received on or before September 1st.

## ALGEBRA.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

## SOLUTIONS TO PROBLEMS.

19. Proposed by A. L. FOOTE, C. E., No. 80, Broad St., New York City.